

## **REMARKS**

Claims 1-11 were pending in the present application. Claims 1, 3, and 9 are objected to for various informalities. Claims 1, 3, 8 and 9 have been amended. Claims 12-18 are new. No new matter has been added. Claims 1-18 are pending.

### **Support for new claims 12-18**

. Claim 12 is directed to determining the induced fracture height and perforation length according to pressure data observed in conjunction with a fracture treatment. One example of support for claim 12 is found within paragraphs 22 and 23. Claim 13 is directed to PVT data varying within the fracture. One example of support for claim 13 is found within paragraph 37. Claim 14 is directed to the introduction of non-Darcy factors in the model. One example of support for claim 14 is found within paragraph 27. Claim 15 is directed to the non-Darcy factors including turbulent gas flow in a fracture. Paragraph 27 describes accounting for non-Darcy compensation for gas flow in a fracture. Non-Darcy factors implies that the assumptions behind Darcy flow are invalid, and laminar flow is the primary Darcy assumption. Therefore, one of skill in the art would understand paragraph 27 as originally submitted to include turbulent flow. Claim 16 is directed to the actual performance comprising a pressure transient. One example of support for claim 16 is found within paragraph 42. Claim 17 is directed to the actual performance comprising a production value. One example of support for claim 17 is found within paragraph 30. Claim 18 is directed to determining the pressure transient data from a mini-frac test. One example of support for claim 18 is found in paragraph 22.

### Response to Claim Objections

The Office Action objects to claims 1, 3, and 9 for various informalities. Applicants respectfully assert that the informalities are removed in amendments to claims 1, 3, and 9. Applicants request the objections to claims 1, 3, and 9 be withdrawn.

### Response to Claim Rejections

#### Regarding Claim 8

Claim 8 is rejected under 35 U.S.C. § 102(a) as being anticipated by Roggero et al. (US Patent 6,662,109, hereinafter, *Roggero*). It is well settled that "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Further, "[t]he identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). *See also* MPEP 2131. Applicants respectfully assert that *Roggero* does not disclose the element "introducing... an induced fracture height and perforation length... into a base model" as recited in claim 8 as amended.

The Office Action asserts that "perforation length and height of a fracture" is disclosed within either the Abstract of Roggero or within the Discussion of the Prior Art of the present invention. The Applicants respectfully assert that the fracture recited in claim 8 as amended is an induced fracture, and therefore the "[t]echniques for integrating natural fracturing data" from the Discussion of the Prior Art is inapplicable to claim 8 as amended. Roggero discloses "a fine geological model representative of the distribution, in a reservoir, of a physical quantity characteristic of the subsoil structure." Roggero, Abstract lines 2-4. Applicants submit that an

induced fracture is not a characteristic of the subsoil structure. Applicants further submit that Roggero is a reservoir model estimating reservoir pressure and geostatistical properties over time. See, e.g. col. 8, lines 7-12; col. 12 equation 31. Roggero does not provide for introduction of an induced fracture into the reservoir, including taking the necessary data to characterize a fracture or introducing calculations to the flow regimes that would exist in the presence of an induced fracture. Therefore, the Applicants respectfully assert that Roggero does not disclose “introducing... an induced fracture height and perforation length... into a base model” as recited in claim 8 as amended.

Because Roggero does not disclose each element of claim 8 as amended, Applicants respectfully request that the rejection of claim 8 under 35 U.S.C. § 102 be withdrawn. Applicants respectfully assert that claim 8 as amended is in a condition for prompt allowance.

#### Regarding Claim 11

Claim 11 recites “wherein the model is repeatedly optimized as actual performance data for multiple zones is collected.” The Office Action rejects claim 11 asserting that Roggero discloses “A flow simulation is carried out for a 42-day period on the reference geostatistical model. The synthetic pressure history [] is defined from the results of this reference simulation by the production well bottomhole pressure, its derivative in relation to time and the bottomhole pressure of the four observation wells.” Quoting Roggero, col. 15, lines 62-67. Applicants respectfully disagree that the asserted section of Roggero discloses the elements of claim 11.

The recited section of Roggero refers to “observation wells” that are actually simulated wells in a “synthetic interference test.” Roggero, col. 14, lines 65-66, and see generally columns 14 and 15 under headings 3. and 3.1. The Applicants respectfully assert that matching data to

synthesized “observation wells” cannot be equivalent to repeatedly optimizing to actual performance data as recited in claim 11. The action of claim 11 (matching to actual performance data) injects new information into the system, while the action of Roggero (matching data to synthesized observation wells) merely refines information already in the system. The Applicants further note that the recited section of Roggero is determining a synthetic pressure history from a single-run calculation, not a model of performance data in a repeatedly improved in a recursive fashion.

Because Roggero does not disclose each element of claim 11 as amended, Applicants respectfully request that the rejection of claim 11 under 35 U.S.C. § 102 be withdrawn. Applicants submit that claim 11 is also allowable as depending upon an allowable claim 8. Applicants respectfully assert that claim 11 is in a condition for prompt allowance.

#### Regarding Claims 12-18

Claims 12-18 are new and not rejected in the present case. However, for the convenience of the Examiner and to expedite prosecution, the Applicants assert some of the novel aspects of claims 12-18. The Applicants assert that Roggero does not disclose any elements of claims 12 and 13. Regarding claim 18, the Applicants assert that Roggero does not disclose an induced fracture or a mini-frac test and therefore Roggero does not disclose the limitations of claim 18. In addition to these assertions, there may be other features of claims 12-18 that are not disclosed in Roggero. Applicants further assert that all of claims 12-18 are allowable as depending upon allowable claims. Therefore, Applicants respectfully assert that claims 12-18 are in a condition for prompt allowance.

### Regarding Claims 1-7

Applicants respectfully assert that claims 1-7 are allowable for substantially similar reasons described above. Further Applicants assert that claims 1-7 are allowable as depending upon an allowable claim. Therefore, Applicants respectfully assert that claims 1-7 are in a condition for prompt allowance.

### Regarding Claims 9-10

Applicants respectfully assert that claims 9-10 are allowable as depending upon an allowable claim. Therefore, Applicants respectfully assert that claims 9-10 are in a condition for prompt allowance.

### Regarding Examiner Note, Office Action Page 5

Applicants agree with Examiner that PVT represents the pressure-temperature-volume fluid property data. Claim 8 as amended is not in conflict with this interpretation. Applicants assert that claim 8 has alternate novel elements over the inclusion of PVT data, so further disagreement with the Examiner on what the references disclose relative to PVT data is moot. However, to preserve the record Applicants assert that the Roggero disclosure of “main production results (pressure, saturation, flow rate, etc)” is not a disclosure referencing PVT data within the normal usage of PVT data. Further, Applicants assert that a flow rate as being volume divided by time is not a disclosure referencing PVT data within the normal usage of PVT data. Applicants further assert that mere reference to production data including the gas-oil ratio or the fraction of water in the oil (Roggero, column 8, line 60) is not necessarily a disclosure of PVT

data within the normal usage of PVT data. Further, Applicants assert that the references do not disclose the use of PVT data within an induced fracture.

Regarding Examiner Note, Office Action page 7

Applicants assert that claim 9 is allowable for reasons discussed above and therefore disagreement on the interpretation of the Examiner Note on page 7 is moot. However, to preserve the record Applicants submit that “differing layers of geological material” (Office Action page 7, Examiner Note, line 4) is not equivalent to “layers involved in the well modeled” from claim 9. A well model may simulate multiple layers within a single geographical layer, or may lump multiple geographical layers within a single layer of interest within the well. Applicants respectfully assert that since no particular correspondence is required between geographical layers and well layers, and since boundaries of well layers and geographical layers do not necessarily align, that well layers and geographical layers are not equivalents. For the purposes of the present invention, while accounting for fluid characteristics that may vary within a single geographical layer, for example an oil layer on water or a gas layer on oil, well layers are meaningfully different than geographical layers. Applicants respectfully assert that the disclosure of seismic data used for acquiring information about subsurface structures (Discussion of the Prior Art) is irrelevant for the purpose of understanding claim 9.

Regarding Examiner Note, Office Action page 10

Applicants assert that claim 1 is allowable for the reasons discussed above.

In summary, for the reasons and amendments detailed above, it is submitted that all claims now presented in the application are in condition for allowance, and accordingly, such action is respectfully requested. Amendments made to the independent claims are applicable to the claims dependent thereon. Applicants submit this paper is fully responsive to the comments in the Office Action and respectfully solicit for this application to be granted in light of these amendments and remarks.

If the Examiner believes that the prosecution of the application would be facilitated by a telephone interview, Applicants invite the Examiner to contact the undersigned at 281-285-8606. The Commissioner is hereby authorized to charge any fees that may be required, or credit any overpayment, to Deposit Account No. 04-1579 (56.0753).

Respectfully Submitted,



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